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COEXISTENCE OF ADULT WORMS, LARVAE AND EGGS OF CYSTOCAULUS OCREATUS WITH HYDATID CYSTS PROTOSCOLICES IN SHEEP LUNGS

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Cystocaulus ocreatus is a small lungworm that lives in the lung parenchyma and in subpleural nodules of small ruminants. The larval stage of *Echinococcus granulosus* or hydatid cyst affects ruminants's lungs, in addition to other tissues. In this study, coexistence of these two parasites in sheep is reported. In 2010, 90 hydatid cysts from sheep's lung were collected from a traditional slaughterhouse in Meshkinshahr, Ardabil province, Iran. During examination of the cysts, in two cases coexistance of a lung nematode with hydatid cyst protoscolices was found. Morphological and morphpmetric characterisations of the nematode were verified. Genomic DNA was extracted from larva and adult. Using PCR, ITS2-rDNA region were amplified; the PCR products were sequenced and the results compared with the sequences in GenBank. Both isolates were identified as *C. ocreatus* based on morphological features and the sequence of the nuclear ITS2 region. In one case, only alive *C. ocreatus* larvae and in the second case, alive egges, larvae and adult male and female were coexisted with protoscolices. Sequences of both isolate (KJ152179.1, KJ152178.1) were homologe, with 100% similarity with registered sequences of *C. ocreatus* in GenBank.Coexistence of alive eggs, larvae and adults of *C. ocreatus* with hydatid cyst protoscolices is a rare and interesting phenomenon. Apparently, chemical composition of hydatid cyst fluid is a suitable medium for development of *C. ocreatus*.

Keywords: *Cystocaulus ocreatus*, hydatid cyst, coexistence, ITS2

COMPARISON BETWEEN THE EFFECTS OF ALBENDAZOLE AND MEBENDAZOLE ON THE ENZYMATIC ACTIVITY OF EXCRETORY/SECRETORY PRODUCTS OF ECHINOCOCCUS GRANULOSUS PROTOSCOLICES IN VITRO

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Hydaticosis is caused by the larvae stage of *Echinococcus granulosus*. The cysts which are formed in human body can be treated clinically by surgery or chemotherapy using albendazole and mebendazole. Glutathione-S-Transferes (GST), same proteases and alkaline phosphatase (ALP) enzymes play important roles in detoxification, peptides proteolysis and protein synthesis of parasites respectively. The purpose of this study was to evaluate the comparison of the efficacy of albendazole and mebendazole on glutathione-s-transferase, alkaline phosphatase and protease enzymes activities in protoscolices of hydatid cyst. Protoscolices were collected and cultured in RPMI1640 media at 37 °C, 5% CO2. The culture supernatants containing the parasite excretory / secretory (E/S) products were collected every 12 hours for 72 hours. The E/S products of treated samples with albendazole and mebendazole and the control one were collected and after centrifugation the protein concentrations were measured according to Bradford method. GST, ALP and protease activities of E/S products were assessed photometrically. In order to determine the statistically significant difference between E/S products of treated and control group, t-test was used. The mean of GST specific activity level in treated protoscolices with albendazole and mebendazole and in control group were obtained 69.44, 132.83, 225.47 U/mg/protein respectively. The mean ALP activity level in treated protoscolices with albendazole and mebendazole and in control group were 19.22, 22.27, 27.85 U/mg/protein respectively. The protease activity level in treated protoscolices with albendazole and mebendazole were not detected.While the mean of protease activity level in control group was 7.61/mg/proteins, statistical analysis showed significant difference between protein concentrations, the specific activities of GST, ALP and protease enzymes in treated protoscolices in comparison with control group ($P<0.05$). Also, the significant difference was seen in specific activities of GST and ALP enzymes in treated protoscolices with albendazole in comparison with treated group with mebendazole ($P<0.05$).The results show that both drugs have inhibitory effects on the activity of GST, ALP and protease enzymes. Albendazole is more effective on the enzymes activities (GST and ALP) as compared to mebendazole. This may by attributed to the different structures of the two drugs and might account for at least in part, difference in anti hydatid mechanism of these benzimidazole derivations.

Keywords: protoscolices, albendazole, mebandazole, protease, glutathione- s-transferase, alkaline phosphatase